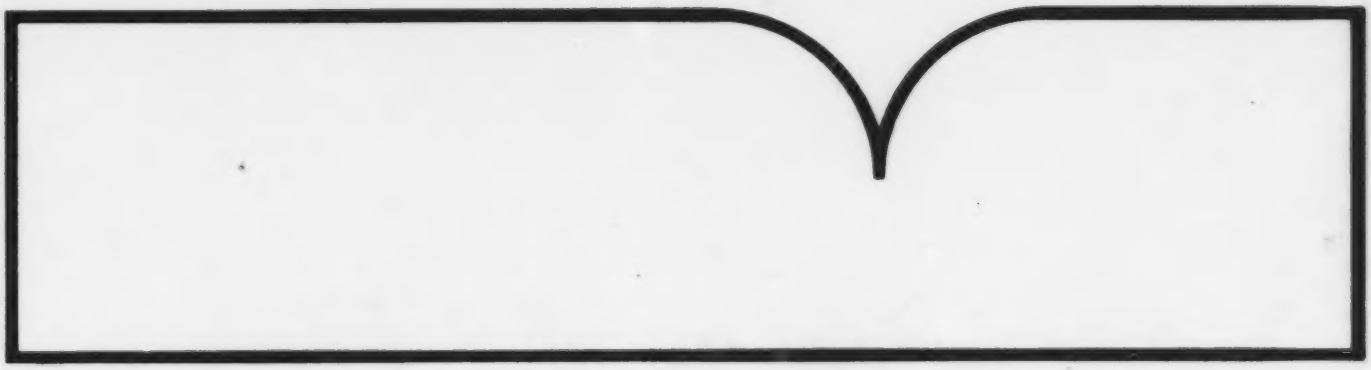
PB81-210189

Progress in the Prevention and Control of Air Pollution in 1978

(U.S.) Environmental Protection Agency
Research Triangle Park, NC

1980



U.S. Department of Commerce
National Technical Information Service
NTIS

PB81-210189

PROGRESS IN THE PREVENTION AND CONTROL OF AIR POLLUTION IN 1978

ANNUAL REPORT OF THE ADMINISTRATOR
OF THE ENVIRONMENTAL PROTECTION AGENCY
to the
CONGRESS OF THE UNITED STATES
in Compliance with
SECTIONS 313, 202, 306(e), and 127(d)
of

PUBLIC LAW 91-604
THE CLEAN AIR ACT, AS AMENDED

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA 22161

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO. PB81 210189
4. TITLE AND SUBTITLE Progress in the Prevention and Control of Air Pollution in 1978		5. REPORT DATE 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Environmental Protection Agency Control Program Development Division, MD-16 Research Triangle Park Durham, N.C. 27711		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS		13. TYPE OF REPORT AND PERIOD COVERED 14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

Section 313 of the Clean Air Act requires the EPA Administrator to report yearly on measures taken toward implementing the purpose and intent of the Act. This report covers the period January 1 to December 31, 1978, and descibes the issues involved in the prevention and control of air pollution and the major elements of progress toward that goal that have been made since the last report. In addition, this report also includes several other reports to Congress required under the Clean Air Act as amended:

1. Section 202 report on measures taken in relation to motor vehicle emission control (Chapter VI); and
2. Section 306(e) report on Federal procurement and violating facilities (in Chapter VII); and
3. Section 127(d) report on prevention of significant deterioration of air qulaity (in Chapter IV).

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution Control	Report to Congress	

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES
unlimited	20. SECURITY CLASS *(This page)*	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

PROGRESS IN THE PREVENTION AND CONTROL OF AIR POLLUTION IN 1978

ANNUAL REPORT OF THE ADMINISTRATOR

OF THE ENVIRONMENTAL PROTECTION AGENCY

to the

CONGRESS OF THE UNITED STATES

in Compliance with

SECTIONS 313, 202, 306(e), and 127(d)

of

PUBLIC LAW 91-604

THE CLEAN AIR ACT, AS AMENDED

CONTENTS

		Page
LIST OF TABLES		iii
PREFACE		v
I.	INTRODUCTION AND SUMMARY	1
II.	AIR QUALITY TRENDS	5
	Air Quality Trends	5
	Air Quality Monitoring	7
III.	DEVELOPMENT OF AIR QUALITY CRITERIA AND STANDARDS	9
	Introduction	9
	Health Effects Research	9
	Terrestrial Ecology Effects of Air Pollution	13
	Scientific Assessment	14
	Transport and Fate	16
	Characterization and Measurement Methods Development	17
	Monitoring	17
	Quality Assurance	18
	Federal Reference and Equivalent Methods	18
IV.	STATUS OF STATE IMPLEMENTATION PLANS (SIPs)	19
	Prevention of Significant Deterioration	20
	Bubble Concept	23
	Transportation Control Measures	24
V.	CONTROL OF STATIONARY SOURCES	26
	New Source Performance Standards	26
	National Emission Standards for Hazardous Air Pollutants (NESHAP)	29
	Research and Development of New and Improved Air Pollution Control Techniques for Stationary Sources	30
VI.	CONTROL OF MOBILE SOURCE EMISSIONS	34
	Introduction	34
	Standard Setting	34
	Compliance Assurance	37
	Certification	38
	Inspection and Maintenance	39
	Assessment	40
VII.	ENFORCEMENT	43
	Stationary Source Enforcement	43
	Mobile Source Enforcement	47
	Compliance by Federal Facilities	53
	The List of Violating Facilities	53

CONTENTS (continued)

		Page
VIII.	LITIGATION IN 1978	55
	District Court Jurisdiction	55
	Hazardous Air Pollutants	55
	Use of Modeling in the Promulgation of SIPs	56
	Ambient Criteria and Standards	56
	References	58

LIST OF TABLES

Table		Page
VI-1.	Federal Exhaust Emissions Standards	36
VI-2.	In-Use Vehicle Emission Performance	42

PREFACE

The Clean Air Act, as amended, authorizes a national program of air pollution research, regulation, and enforcement activities. This program is directed at the Federal level by the U. S. Environmental Protection Agency (EPA). However, primary responsibility for the prevention and control of air pollution at its source continues to rest with state and local governments. EPA's role is to conduct research and development programs, set national goals (via standards and regulations), provide technical and financial assistance to the states, and, where necessary, supplement state implementation programs.

Section 313 of the Clean Air Act requires the Administrator to report yearly on measures taken toward implementing the purpose and intent of the Act. This report covers the period January 1 to December 31, 1978, and describes the issues involved in the prevention and control of air pollution and the major elements of progress toward that goal that have been made since the last report. In addition, this report also includes several other EPA reports to Congress required under the Clean Air Act, as amended:

1. Section 202 report on measures taken in relation to motor vehicle emission control (Chapter VI);
2. Section 306(e) report on Federal procurement and violating facilities (in Chapter VII); and
3. Section 127(d) report on prevention of significant deterioration of air quality (in Chapter IV).

I. INTRODUCTION AND SUMMARY

AIR QUALITY TRENDS

In many areas of the country, the general downward trend in total suspended particulate (TSP) levels in the early 1970s was followed by a gradual leveling off. The trends for sulfur dioxide (SO_2) show dramatic improvement in the 1972-1974 period, followed by fairly consistent continuing improvement through 1977. Eighty percent of the carbon monoxide (CO) sites showed long-term improvement from 1972 to 1977. The national trend for ozone (O_3) was stable for the 1972-1977 period, with the reduction in volatile organic compound (VOC) emissions largely offset by increased motor vehicle miles traveled and increased industrial process emissions. Only two percent of the sites monitoring nitrogen dioxide (NO_2) violated the standard in 1977.

DEVELOPMENT OF AIR QUALITY CRITERIA AND STANDARDS

EPA promulgated a national ambient air quality standard (NAAQS) for lead in October 1978. The standard was set at 1.5 µg Pb/m^3, with averages to be calculated over a calendar quarter.

EPA also promulgated a NAAQS for ozone in 1978. The level of both the primary (health) and secondary (welfare) standard was changed from 0.08 to 0.12 ppm and the chemical designation was changed from photochemical oxidants (O_x) to ozone (O_3).

STATUS OF STATE IMPLEMENTATION PLANS (SIPs)

As a result of the Clean Air Act Amendments of 1977, EPA drafted a list of areas not attaining the various national ambient air quality standards. This was promulgated on March 3, 1978 with some subsequent modification. States are now in the process of submitting SIP revisions to EPA for approval.

EPA published final regulations for the prevention of significant deterioration (PSD) of air quality on June 19, 1978.

On January 18, 1979, EPA proposed a policy to allow plants to reduce control where costs were high in exchange for an equal increase in control where abatement is less expensive (bubble concept). This was promulgated on November 29, 1979.

In 1978, EPA and the Department of Transportation signed a memorandum of understanding of the integration of transportation and air quality planning and jointly issued guidelines.

CONTROL OF STATIONARY SOURCES

During 1978, EPA promulgated new source performance standards for kraft pulp mills, lime plants, and grain elevators; the Agency proposed nine revisions and amendments for existing standards. A revised new source performance standard for sulfur dioxide, nitrogen oxides, and particulate emissions from new fossil-fuel-fired electric utility steam generating units was developed and proposed in 1978.

In 1978, EPA also undertook the development of an airborne carcinogen policy to set forth planned approaches for identifying, assessing, and regulating carcinogens.

CONTROL OF MOBILE SOURCE EMISSIONS

Regulations issued in 1978 included rulemaking for high-altitude vehicles and a regulation to limit tampering with vehicle emissions control system parameters.

During 1978, EPA revised its preproduction certification review program to allow the Agency to concentrate on those engine families with the greatest potential for affecting air quality.

In 1978, EPA's inspection and maintenance (I/M) activities focused on collecting technical information and supporting states and localities that needed I/M elements for their 1979 SIPs.

Although performing better than earlier uncontrolled vehicles, tests have shown that between one-half and two-thirds of even relatively new in-use cars fail at least one of the emission standards. EPA has begun a program of restorative maintenance testing to discover the reasons for this persistent failure. The tests have confirmed that even simple maintenance can dramatically improve emission control.

ENFORCEMENT

Stationary Source Enforcement

EPA devoted a great deal of effort in 1978 to development of regulations, both for Section 120 noncompliance penalties and for Section 119 primary nonferrous smelter orders.

The 1977 Clean Air Act Amendments gave EPA new responsibilities for accelerated enforcement against all major stationary source violators. Consequently, EPA began its major source enforcement effort (MSEE) to bring large recalcitrant sources into compliance.

During FY 1978, EPA initiated 143 major air stationary source civil actions and filed 30 civil actions. As part of the MSEE drive, EPA proposed 43 delayed compliance orders (DCOs) and promulgated 26; the states proposed 59 DCOs and promulgated 24.

In addition, in 1978, EPA reached important pollution control agreements with Republic Steel and the Tennessee Valley Authority.

Mobile Source Enforcement

In 1978, EPA conducted 31 inspections and 7 investigations of auto manufacturers. During FY 1978, 2.8 million vehicles were recalled, either by EPA order or as a result of an EPA investigation; during that same period, 1.7 million vehicles were voluntarily recalled by manufacturers to correct emissions problems.

In FY 1978, EPA conducted approximately 21,000 inspections of service stations to ensure compliance with the unleaded fuel regulations. For this period, EPA issued approximately 560 complaints and collected $250,000 in penalties.

Forty-four tampering litigation reports were referred to the Department of Justice in FY 1978. Civil penalties of $44,100 were collected under tampering case settlements and judgments in that period.

Compliance of Federal Facilities

The President issued Executive Order 12088, "Federal Compliance with Pollution Control Standards" on October 13, 1978. As of March 31, 1979,

60 (20 percent) of the 294 Federal facilities classified as major sources of air pollutants were not meeting applicable air quality standards and emission limitations. Of these 60 sources, 12 have installed pollution control equipment, 21 are in the process of installing it, and 23 have plans to correct their pollution problems.

LITIGATION IN 1978

Among the important court decisions in 1978 was a decision by the Sixth Circuit upholding EPA's promulgation of the Ohio SIP for SO_2. In particular, EPA's extensive use of air quality dispersion modeling was allowed as a "rational choice."

Other important court decisions in 1978 dealt with district court jurisdiction, hazardous air pollutants, and ambient criteria and standards.

II. AIR QUALITY TRENDS

AIR QUALITY TRENDS

Total Suspended Particulate (TSP)

Total suspended particulate levels have improved throughout the nation during the 1970's. The general trend shows long-term improvement with a gradual leveling off in the past few years.

From 1972 to 1977, the nationwide average TSP levels decreased 8 percent, an improvement of almost 2 percent per year. While most monitoring sites show improvement, the decrease in TSP levels is most pronounced among the higher concentration urban sites. The overall trend of improvement from 1972 through 1975 was followed by a reversal in some regions in 1976 because of abnormally dry weather conditions. Nevertheless, 60 percent of the sites showed long-term improvement from 1972 to 1977. For those sites with TSP concentrations exceeding the annual standard, 77 percent showed long-term improvement. In 1977, approximately 25 percent of the sites reported their lowest annual values.

Although there has been a nationwide decrease in levels of TSP matter, there is evidence that levels of some of the particulates that make up the total may be increasing. This is indicated by a trend of increases in secondary particulates, such as sulfates.

Sulfur Dioxide (SO_2)

Since 1970, throughout the nation sulfur dioxide levels in urban areas have gradually improved. The 1972-1977 trends show dramatic initial improvement in the period 1972-1974, followed by fairly consistent continuing improvement. In most urban areas, this is consistent with the switch in emphasis from attainment of standards to maintenance of air quality, i.e., the initial effort to reduce pollution to acceptable levels was followed by efforts to maintain air quality at these lower levels.

Although SO_2 levels continued to improve in the middle 1970's the rate of improvement was much less pronounced than in earlier years. From 1972 through 1977, the national average SO_2 level dropped 17 percent, an annual improvement rate of 4 percent per year. As would be expected, the majority of sites showed improvement during this period.

Short-term changes in SO_2 levels between 1976 and 1977 were mixed, with no predominant trend. Most urban area SO_2 monitors reported levels well below the annual standard. The remaining SO_2 problems are primarily associated with specific point sources which are responsible in part for the increasing levels of sulfates.

Carbon Monoxide (CO)

Ambient levels of CO generally improved from 1972 to 1977. During this period, 80 percent of the CO sites showed long-term improvement. This trend was fairly consistent nationally. The median rate of improvement for the 90th percentile of 8-hour values was approximately 6 percent per year. From 1976 to 1977, 70 percent of the 243 sites improved. Consistent with this downward trend, almost one-third of these sites reported their lowest values in 1977.

Ozone (O_3)

The national ozone trend was basically stable over the 1972-1977 period. California, with the longest recognition of an O_3 problem, continues to show a trend of decreases. Many sites outside California, with more limited historical data, have exhibited a slight increase in O_3 levels in recent years. This stable national O_3 trend is consistent with the national emission trend in volatile organic compounds (VOC). The reduction in VOC emissions from new cars has been largely offset by the 30 percent increase in motor vehicle miles traveled between 1970 and 1977 and the increased industrial process emissions. The result is stability in both air quality and emission trends.

Ozone is the most pervasive air pollution problem in the country. In 1977, 86 percent of the O_3 sites violated the previous O_3 national ambient air quality standard (NAAQS) of 0.08 parts per million (ppm) (160 $\mu g/m^3$) not to be exceeded more than one hour per year. In January 1979, a revised O_3

NAAQS was promulgated, raising the level to 0.12 ppm (235 $\mu g/m^3$); the expected number of exceedances must be less than one per year. With this new standard 35 percent fewer sites exceeded this violation level more than one day in 1977.

Nitrogen Dioxide (NO_2)

Trends in NO_2 levels were investigated for 518 sites throughout the nation over the 1972-1977 period. For the nation, there were many more sites showing increases (312) than decreases (176). However, for most of these sites there is only 3 or 4 years of data, so these trend patterns are tentative. Only 18 (2 percent) of the 933 sites monitoring NO_2 violated the annual primary standard in 1977.

AIR QUALITY MONITORING

The goal of regulatory changes proposed by the U.S. Environmental Protection Agency is a streamlined, high-quality, more cost-effective national air monitoring program.

The revisions proposed in 1978 after discussion with the states would:

1. Set stringent requirements for a refined national monitoring network in areas with high population and pollutant concentrations in order to provide a sound data base for assessing national trends.
2. Give states flexibility to use resources freed from State Implementation Plan (SIP) monitoring work to meet their own needs.
3. Establish uniform criteria for siting, quality assurance, equivalent analytical methodology, sampling intervals, and instrument selection, to assure consistent data reporting among the states.
4. Establish a national uniform air quality index and require it for major metropolitan areas.
5. Provide precision and accuracy estimates with the air quality data, to permit better interpretation of data quality.

In the newly defined program, states would establish a SIP network of State and Local Air Monitoring Stations (SLAMS). The full network would have to be in place by January 1, 1983. States would have to evaluate the SLAMS network annually to add, delete, or relocate monitoring stations to satisfy their own, as well as EPA, data needs.

States may have additional monitoring stations that are not part of the SLAMS network. These would be called Special Purpose Monitoring (SPM) stations. They would not be subject to EPA requirements unless the information is used for SIP purposes.

In addition, states would operate certain stations, selected from the SLAMS network, to provide EPA with data for making nationwide assessments and establishing national trends. These stations, to be designated by January 1, 1981, would continue as part of the SLAMS network, but would be called National Air Monitoring Stations (NAMS). The NAMS would be located in areas of highest pollutant concentration and high population density.

III. DEVELOPMENT OF AIR QUALITY CRITERIA AND STANDARDS

INTRODUCTION

Air quality criteria documents were issued for particulate matter, sulfur oxides, hydrocarbons, photochemical oxidants, carbon monoxide, and nitrogen oxides from January 1969 through January 1971. On April 30, 1971, after these criteria were issued, EPA established primary and secondary national ambient air quality standards (NAAQS) for these pollutants.

On September 14, 1973, EPA revised the standards by revoking the annual secondary standard for sulfur dioxide (SO_2) and revising the Air Quality Criteria for Sulfur Oxides. The maximum 24-hour concentration published as a guide for the development of State Implementation Plans (SIPs) was deleted.

EPA promulgated the NAAQS for lead in October 1978 in response to the court order in NRDC et al. vs. Train. This standard, which had been proposed in December 1977, was set at 1.5 µg Pb/m^3, with averages to be calculated over a calendar quarter. The standard is especially significant because of the precedent it establishes as the first NAAQS for a multi-media pollutant.

EPA also promulgated the NAAQS for ozone (O_3) in 1978. The level of the primary (health) and secondary (welfare) standard was changed from 0.08 to 0.12 parts per million (ppm) and the chemical designation of the standard was changed from photochemical oxidants (O_x) to ozone (O_3).

In response to the Clean Air Act Amendments of 1977, EPA is now reviewing and, if necessary, revising NAAQS for the remaining NAAQS pollutants (carbon monoxide, hydrocarbons, nitrogen oxides, particulate matter, and sulfur oxides). This work is scheduled to be completed by December 1980.

HEALTH EFFECTS RESEARCH

The health effects research program is divided into three program components: Criteria Pollutants, Non-Criteria Pollutants, and Transportation

Sources. The program incorporates epidemiological studies and animal toxicological studies, focusing on those air pollutants that are known or suspected to harm public health.

Criteria Pollutants

In this area, studies are conducted on the air pollutants for which NAAQS have been set. Results of these studies are used to evaluate the adequacy of existing ambient air quality criteria and to provide a scientific basis for improving these criteria. The Clean Air Act Amendments of 1977 require that the ambient criteria and NAAQS be reviewed and appropriately revised at 5-year intervals.

These studies include animal toxicology and controlled human exposure (clinical) studies which assess the harm to health associated with exposure to one or more criteria pollutants. The animal and human studies focus on effects of exposure to combinations of O_3 and SO_2. These studies will be followed by similar ones on the effects of exposure to carbon monoxide (CO) and nitrogen oxides (NO_x). The animal studies employ various combinations of pollutants and exposure times to identify additive or synergistic effects on the respiratory system. The clinical studies address the effects of short-term exposure to the same combinations of criteria pollutants. These effects are tested on healthy volunteers and on those in whom asthma-like respiratory airway reactivity has been simulated pharmacologically.

In 1978 the major accomplishments in the criteria pollutants area included:

1. Two studies performed in Los Angeles, California. One of these was an epidemiologic study which evaluated the health effects of photochemical oxidants on asthmatics, patients with chronic bronchitis, athletes, and outdoor workers. The other study revealed that chromosomal abnormalities do not seem to be a sensitive indicator of environmental air pollution exposure.

2. Four groups of controlled human exposure (clinical) experiments to assess the effects of ozone on human physiologic parameters. The findings included evidence that exercise is one of the major determinants

of response to ozone. Evidence was also found that, in health subjects, decrements in pulmonary function caused by ozone exposure disappear after three to four days of the exposure.

3. Animal inhalation exposure studies to assess the effects of short-term exposure to nitrogen dioxide (NO_2), both alone and in combination with O_3. The combination was found to have additive effects on increasing susceptibility to infectious respiratory disease. Data generated from variable exposures to these gases, both with and without the added stress of elevated temperature, will support chronic exposure studies in FY 1979. In addition, one of the studies indicates that low concentrations of O_3 or NO_2 have systemic effects that may be related to how the body handles other chemicals.

4. An epidemiologic study performed in Dallas, Texas, to determine effects of exposure to low-level traffic density (less than 30,000 cars per day) on blood lead levels. (Equivalent air exposures were less than 1.5 to 1.6 micrograms per cubic meter of lead.) No increase in blood lead was observed.

5. A study of the geographic distribution of increased lead absorption as measured by the levels of lead in the deciduous teeth of children living in Cleveland, Ohio. The teeth of some children from suburban neighborhoods were found to contain lead levels as high as those in the teeth of some children from inner city neighborhoods.

Non-Criteria Pollutants

Research in this area deals with air pollutants for which no NAAQS have been set and with selected trace substances. Its purpose is to determine whether these unregulated pollutants should be controlled in order to protect human health. Major activities are epidemiological studies, *in vivo* and *in vitro* animal toxicological studies, and human clinical studies. These focus on pollutants of greatest priority, including particulates such as sulfates, nitrates, and trace metals. This research characterizes both acute and chronic effects of exposure to these particulate air pollutants. The studies are specifically designed to determine the relationship of particulate size to observed

harm to health and to evaluate the possible additive/synergistic effects of exposure to combinations of particulates and gases. Listed below are some of the major accomplishments in 1978:

1. The establishment of the clinical laboratory evaluation and assessment of noxious substances (CLEANS) aerosol facility. This gives the Agency the ability to generate water soluble particles with a wide range of sizes and concentrations for human exposure studies.

2. Animal inhalation exposure studies to assess the effects on normal animals of two diameter ranges of sulfuric acid, 0.3 micrometers and 0.05 micrometers, alone and in combination with manganese particles. The data failed to indicate that toxicity was related to particle size. In additional animal studies, protective lung cells were exposed in vitro to metal-coated fly ash particles. It was found here that toxicity increased as particle size decreased.

3. An autopsy study performed in Dallas on white males in six ten-year age ranges (0-9 to 50-59) in an attempt to determine whether normal cadmium concentrations increased with age, up to age 50. It was determined that human cadmium levels in America are higher than those in Sweden but lower than those in Japan.

Transportation Sources

This research analyzes emissions from mobile sources. The major objective is to provide information about health effects for decisions on certification of gasoline and diesel vehicles. Current emphasis is on diesel engines, with studies being conducted to determine the extent to which diesel exhaust is carcinogenic.

EPA is conducting a series of studies for total diesel emissions, specific diesel emission components, and emission products from new catalyst control systems. These studies include whole animal inhalation studies which expose both normal and specifically developed sensitive strains of rodents to diesel exhaust, to determine whether tumors develop. Non-carcinogenicity studies with whole animals focus on identifying chronic obstructive lung disease and neurobehavioral effects. Epidemiological studies are being developed to determine morbidity and

mortality effects of diesel emissions. In vitro screening tests are used to help characterize emissions and to identify hazardous biological activity. In conjunction with in vivo tests, components of diesel emissions are being analyzed and their health effects characterized. Specific accomplishments include:

1. A study on sulfuric acid emissions from oxidation catalyst equipped vehicles. This study determined that the emission levels are too low to cause significant public health effects.

2. Various in vitro screening tests on components of the particulate fraction of diesel exhaust. The particulate was found to contain mutagens and chemicals that cause neoplastic transformations in mammalian cell systems.

3. Range-finding inhalation studies using cats, rats, mice, and guinea pigs to evaluate levels of the total diesel exhaust from a light duty engine. Measurement of all appropriate biological effects endpoints show no significant acute effects.

4. Three short-term experiments which found that mortality from infection was greater in mice exposed to diesel exhaust than in mice in air-exposed control groups.

5. Exposure tests on the neurobehavioral effects of diesel exhaust on neonatal rats. The results show a significantly suppressed body weight and a depressed locomotor activity after exposure when compared to control animals.

TERRESTRIAL ECOLOGY EFFECTS OF AIR POLLUTION

Air pollution effects research on crop, vegetation, and natural ecosystems has provided important new information for updating Air Quality Criteria Documents. These "welfare" effects form the basis for national secondary ambient air quality standards.

The role of vegetation as a natural source of reactive hydrocarbon precursors to photochemical oxidants is uncertain, but most agree that it only marginally increases ozone levels in urban areas. Agency research on this subject has already generated some important results. Monoterpene emission rates from slash pine in the light were similar to those in the dark. Total monoterpene emissions ranged from 3 to 8 µg C/g dry wt/hr

depending on ambient temperature. Emissions rates are closely related to the vapor pressure of the individual monoterpene. The emission of isoprene from oak is controlled by leaf temperature during most of the day. Light is required to provide the energy for isoprene biosynthesis but it is the limiting factor only early in the morning and late in the afternoon. Over 80 percent of the daily isoprene emissions occur after 10 a.m. Maximum isoprene emission rates are approximately 75 µg C/g dry wt/hr.

In acid rain experiments, forest productivity and nutrient cycling were assessed in plots of model forest ecosystems. Several changes were observed in sugar maple ecosystems involving the effects of various acidified rain treatments in comparison with the control (pH 5.7). These included an increase in the leaching of calcium, magnesium, and ions from water passing through the forest litter to soil and an increase in the removal of calcium from leaf litter. The germination of some tree species was inhibited by acidified rain, but the germination of other species was increased. The effects of acidified rain on other plant processes involving plant growth and litter decomposition are being evaluated. In studies already completed, acidified rain inhibited the growth of radish roots and the yield of snap bean.

Emissions from coal-fired power plants may not produce immediate dramatic changes in surrounding plant and animal communities, but over a period of time changes may occur in the ecosystem's capacity to support normal grazing pressures. In SO_2 fumigation tests in eastern Montana, protein content and digestibility of western wheat grass decreased. Metabolism, growth, and reproduction of grass species were altered. Lichen populations important in stabilizing soil were decimated. Populations of beetles important to decomposition were reduced. Activity of some soil micro-organisms decreased. All this evidence indicates substantial changes in a grassland ecosystem should the chronic stress from SO_2 continue over an extended period of time.

SCIENTIFIC ASSESSMENT

The scientific assessment program provides EPA's regulatory programs with a centralized capability for evaluating information of health and

ecological effects from exposure to pollutants and estimating the level of health risk involved. The program is capable of reviewing known information about pollutant effects, interpreting this information, and producing scientific data summaries to be used for subsequent risk assessment in making other regulatory decisions. EPA intends the hazard assessment portion of the program to be responsible for maintaining consistency and quality among the risk assessments prepared throughout the Agency. To ensure this, the program will establish agency-wide guidelines and will review completed assessments. In certain media, the program conducts risk assessments and prepares criteria documents itself. Typical outputs from the scientific assessment program include reviews, guidelines (including guidelines on exposure assessment), health criteria documents, health assessments, reports on special health/exposure situations, both preliminary and full risk assessments dealing with carcinogenic potential, and a new initiative dealing with mutagenic effects.

In October 1977 the scientific assessment program had two components: the Carcinogen Assessment Group (CAG) and a criteria and effects assessment activity. The CAG developed guidelines for the evaluation of carcinogenic potential and risk, performed risk assessments for the major EPA regulatory offices, reviewed assessments for some Agency program offices, and acted as a health policy advisor to the Agency.

The criteria and effects assessment activity did the following: (1) initiated work on four new air criteria documents, including particulates, sulfur oxides, carbon monoxide, and oxides of nitrogen; (2) completed work on three criteria documents--lead, photochemical oxidants, and short-term nitrogen dioxide; (3) started health assessments for two pollutants--perchloroethylene and ethylene dichloride; (4) developed a special assessment document dealing with altitude as a factor in air pollution; and (5) completed a background technical report on photochemical oxidants. The need for specific assessments are identified by the program offices and the completed products are almost always incorporated into Agency regulatory packages as supporting scientific information.

The air criteria and effects assessment activity is increasing its work. Specific work plans include: (1) finishing air criteria documents for oxides of nitrogen and carbon monoxide; (2) finishing health assessments for perchloroethylene, ethylene dichloride and cadmium; (3) starting new health assessments for asbestos, haleothers, polynuclear aromatic hydrocarbons, and polycyclic organic material (multimedia), as well as for nickel, antimony, and zinc. In addition, three special reports will be started and completed, including reports to Congress on sulfur emissions from mobile sources, health and welfare effects associated with particulates, and a special assessment of the acid rain problem.

TRANSPORT AND FATE

The first major field study in the Sulfur Transport and Transformation in the Environment (STATE) program was conducted during August 1978 on TVA's Cumberland Power Plant. Using fully instrumented aircraft and mobile vans, the coherent power plant plumes were tracked for distances up to 410 kilometers downwind. The chemical and meteorological data collected during the power plant plume studies will be used for the development and validation for sulfur dioxide/sulfate air quality models.

Five comprehensive air quality simulation models (AQSMs) have been carefully evaluated for future verification studies. These AQSMs have been developed to predict ambient sulfate and oxidant levels in urban atmospheres. Some of these AQSMs, with proper modification, may be usable for air quality prediction at the regional scale.

The first phase of the Houston air quality field study has been completed. Ambient measurement data were collected on major photochemical pollutants such as oxidants, aerosols (including sulfates), nitrogen oxides, and hydrocarbons. The later phases of the study include the acquisition of an air pollutant emission inventory for the Houston area followed by development and application of air quality simulation modeling.

An historical study was conducted on visibility trends in the Northeast. It concluded that visibility in the Northeast had declined significantly during the past 25 years, especially in the nonurban locations where major visibility declines of 10-40 percent were observed. The urban/suburban areas showed smaller visibility declines on the order of 5

percent. These studies on visibility contribute to the overall knowledge of the role of pollutants, especially atmospheric fine particulates, on degrading visibility in various areas of the nation.

CHARACTERIZATION AND MEASUREMENT METHODS DEVELOPMENT

Characterization studies have been conducted on plumes from power plants that burn residual oil containing various amounts of sulfur and vanadium. Preliminary results indicate that sulfate emissions can reach as high as 10 percent of the total sulfur oxide emissions. This information will be useful in determining the contributions of primary sulfate emissions from power plants to total airborne sulfate burdens.

For mobile sources, measurement and characterization studies have shown the effect of various catalytic control systems on automotive exhaust emissions (regulated pollutants and sulfuric acid). These studies have also indicated potential problems associated with advanced catalytic control systems and drawn attention to the potential release of mutagenic pollutants in diesel exhaust.

In the measurement of ambient air particulates such as sulfates, free acid, and nitrates, collection efficiency has presented a long standing problem. A promising research result has been the demonstration that high purity quartz filters will provide significant improvement over commonly used glass fiber filters for sampling particulate nitrates.

In order to measure areawide emission densities, especially fugitive emissions, a variety of measurement methods has been sought. One remote optical measurement technique developed by EPA shows promise. For example, in a recent field study, it was shown that specific air pollutants could be measured in the 10 ppb concentration range.

MONITORING

Stationary Sources Emissions Measurement

The experimental work on polychlorinated biphenyls (PCB) was completed. The Agency has written reports on measuring PCB in transformer fluids and incinerator emissions.

Mobile Source Emissions

EPA has completed a pilot study on CO intrusion in motor vehicles. The study found the levels in school buses and taxis to be of sufficient magnitude to evoke concern. The Agency has written a report to Congress on these findings. EPA has initiated a large scale study on CO intrusion. The 1977 Fuel Additive Manufacturers report has been reviewed and issued.

Ambient Air Measurements

EPA validated the method for measuring PCB in ambient air and completed a draft protocol for the development, evaluation, site selection, and deployment of an Inhalable Particulate (IP) Network. The Agency also completed a pilot study where eight different samplers were operated side-by-side. Evaluation of the data from this will allow EPA to decide on the type of samplers for the complete network. Nomographs for simplifying the calculation of the Pollutant Standard Index (PSI) have been prepared and issued to state and local monitoring stations.

QUALITY ASSURANCE

Assistance was provided for revision to the requirements for reporting air quality data to EPA for State and Local Monitoring Stations (SLAMS) and prevention of significant deterioration (PSD). An intercomparison study of environmental radiological laboratories has been completed. Radionuclide standards, traceable to the National Bureau of Standards, have been prepared and made available to laboratories making radiation measurements. A progress report on monitoring performed by the Ute Laboratory has been published.

FEDERAL REFERENCE AND EQUIVALENT METHODS

Two reference methods (nitrogen oxide analyzer, ambient CO monitor) and four equivalent methods (SO_2) were approved and published in the Federal Register.

IV. STATUS OF STATE IMPLEMENTATION PLANS (SIPs)

In the 1970 Amendments to the Clean Air Act, Congress directed EPA to establish primary national ambient air quality standards (NAAQS) to protect the public health and secondary NAAQS to protect the public welfare. Congress also directed the states to develop and adopt SIPs to attain and maintain these standards. In 1971, EPA promulgated NAAQS for sulfur oxides, particulate matter, carbon monoxide, ozone (originally called photochemical oxidants), and nitrogen dioxide. SIPs were developed and placed into effect. To meet statutory deadlines, the NAAQS were to have been attained in most regions by 1975, with some extensions until 1977.

By 1976 it became apparent that, despite significant progress, SIPs were inadequate to achieve the NAAQS in many areas of the country. EPA therefore issued numerous calls for states to revise their SIPs to provide for attainment. Questions also arose as to whether, and under what circumstances, new stationary sources might legally be permitted to construct in areas where the NAAQS were not being met. In response to these questions, EPA published its Emission Offset Interpretative Ruling. This ruling allowed new construction in areas where NAAQS were violated as long as stringent conditions were met that would assure further progress in attaining the standards.

In August 1977 Congress amended the Act to (among other things) establish a statutory approach to permit growth in polluted areas, while requiring attainment of the NAAQS by specific deadlines. Congress first instructed each state to list those areas where NAAQS were still not attained as of August 7, 1977 (nonattainment areas) and instructed EPA to promulgate the list with any necessary changes. Each state then had to submit a SIP revision by January 1, 1979 providing for attainment of the NAAQS as expeditiously as practicable for primary standards but no later than the end of 1982 (or the end of 1987 for areas with particularly

difficult ozone or carbon monoxide problems). Congress also provided that EPA's Offset Ruling would govern new source construction until July 1, 1979; after this date proposed major sources would be reviewed under the provisions of a revised SIP.

A list of nonattainment areas was promulgated on March 3, 1978 with some subsequent modification. SIP revisions are required for these areas.

PREVENTION OF SIGNIFICANT DETERIORATION

Final Regulations

On June 19, 1978 the Agency published final regulations for the prevention of significant deterioration (PSD) of air quality. (See 43 FR 26380.) The regulations established guidance for the approvability of SIPs for state PSD programs. The regulations published also incorporated the PSD requirements of the 1977 Amendments into EPA's Federally-run preconstruction permit program for the review of new sources and modifications.

On September 5, 1979, the Agency proposed major changes to the June 19, 1978 PSD regulations. (See 44 FR 51924.) This was done in response to a court interpretation of these regulations (Alabama Power Co. vs. Costle 13 ERC 1225; 13 ERC 1993). Major changes were proposed addressing source applicability, geographic applicability, monitoring requirements, baseline and control technology issues, and definition of potential emissions, among others.

SIP Progress

Most state agencies have not had sufficient resources to prepare a SIP for PSD and at the same time prepare SIP revisions for nonattainment areas under the requirements of Section 172 of the Act. State plans for PSD are expected to be submitted throughout 1979 and, in some cases, during 1980. The Agency expects that, within a year-and-a-half of the March 1979 due date for state PSD plans, the great majority of states will have prepared SIP amendments. Some states have requested and

received delegations of authority to run the program while they prepare SIP revisions. At this time, some states are expecting to incorporate the EPA PSD regulations virtually verbatim into their own state regulations. Other states are expected to submit for approval PSD programs significantly different in form from the EPA PSD regulations as published. The Agency is working with these states and with air pollution control agency associations to assure that such state programs can be approved as being equivalent to the EPA program.

PSD Set II (Other than SO_2 and TSP)

The Clean Air Act also calls for the Agency to promulgate regulations to prevent significant deterioration resulting from hydrocarbons, carbon monoxide, photochemical oxidants, nitrogen oxides, and lead. EPA has conducted a preliminary review of the issues and options related to developing a PSD program for these pollutants and is now creating a formal working group. In addition, a contractor study has been let to further examine the related issues. Presentations have been made before a committee of the National Academy of Sciences to familiarize them with this effort. To date, the Agency has not determined that any legislative changes are needed to implement strategies for controlling Set II pollutants on a Regional or multi-state basis.

Visibility

The Clean Air Act Amendments provide for the protection of air quality related values, including visibility within the nation's Class I PSD areas. In addition, the Amendments set out a national goal of preventing any future visibility impairment and remedying any existing visibility impairment in mandatory Class I Federal areas. SIPs must contain measures necessary to make reasonable progress toward meeting this national goal. Development of guidance for the characterization, measurement, monitoring, and modeling of visibility impacts is currently being supported by EPA alone and in cooperation with the Departments of Interior, Agriculture, and Energy, and the Council on Environmental

Quality. These efforts aid EPA in reviewing PSD permit applications to determine a proposed source's effects on visibility and in developing SIP visibility regulations.

BUBBLE CONCEPT

The Clean Air Act requires that states adopt implementation plans to attain and maintain ambient air quality standards as expeditiously as practicable, but no later than by dates set forth in the statute. In developing these plans states adopt regulations setting forth emission limits which, when applied to sources contributing to the ambient air problem, are calculated to assure that standards are attained. In making these decisions states regularly take into account the nature and amount of emissions from each source, the control technology available, and the time required for its installation. However, SIPs are not necessarily as economically efficient as possible nor are regulated companies prompted to seek innovations in control technology.

For this reason, on January 18, 1979, the Environmental Protection Agency proposed a policy to allow plants to reduce control where costs are high in exchange for an equivalent increase in control where abatement is less expensive (bubble concept). The policy statement recommends that the states inform source owners of the availability of an alternative emission reduction approach within the SIP, explain the advantages and conditions of use, and be receptive to proposals from source owners seeking to employ the more cost-effective mix of controls this policy allows. This policy statement was promulgated on November 29, 1979.

Under the policy, sources may obtain financial savings by employing more cost-effective mixes of control techniques than current process-by-process regulations allow, as long as total environmental benefits are not reduced. Properly applied, the alternative approach should promote greater economic efficiency and increased technological innovation.

The possible financial savings of the alternative approach will provide an economic incentive to plant managers to develop innovative

control strategies. This is one of the few opportunities to provide positive incentives for innovation, and the new control strategies developed in response to the program could be used as a basis for setting tighter standards in the future.

It is important to note, however, the flexibility this policy allows can only be granted in areas where states have successfully demonstrated that they can meet air quality standards by the statutory deadlines. Therefore, EPA will not allow the alternative approach to be used in a way that jeopardizes attaining requirements of the Clean Air Act by permitting degradation of air quality in excess of the SIP requirements or by weakening enforcement. To avoid these problems, the use of the alternative approach is carefully conditioned as described in detail in the body of the proposed policy statement. The policy is intended, and should be interpreted, as an alternative way to expeditiously comply with the SIPs' requirements.

TRANSPORTATION CONTROL MEASURES

In June 1978 EPA and the Department of Transportation (DOT) jointly issued "Transportation - Air Quality Planning Guidelines" which have been widely distributed to Federal, state, and local air quality and transportation agencies as well as to regional planning agencies. At the same time, EPA and DOT signed a memorandum of understanding regarding the integration of transportation and air quality planning.

EPA published information documents in May 1978 on transit improvement, bus lanes, carpools, vanpools, automobile inspection and maintenance programs, and vapor recovery from gasoline marketing. Other information documents are under preparation, with publication expected in 1979. In September 1978, in order to review transportation control portions of SIP submittals in a consistent and efficient manner, EPA prepared and distributed a "Checklist for Review of Transportation Portions of 1979 SIP Submissions."

In 1978, EPA proposed regulations on intergovernmental consultation requirements. The Agency held a public hearing and incorporated comments into a final regulation which it expects to promulgate in 1979. In order to assist state and local governments, EPA widely distributed "Section 174 Guidelines" (guidance on designation of lead planning organizations for nonattainment areas and on determination of interagency responsibilities). The guidance was issued jointly by EPA and DOT.

EPA and DOT also signed an interagency agreement on November 3, 1978 regarding integration of transportation and air quality planning funds. In December 1978 the two agencies jointly announced the availability of urban air quality planning grants and set forth policies and procedures for applying for funds.

Under the 1977 Amendments, the Administrator of EPA and the Secretary of DOT shall not approve projects or award any grants where the Administrator finds, after July 1, 1979, that a state has not submitted a SIP or is not making a good faith effort to submit one. EPA and DOT have negotiated a draft policy for applying these funding limitations. The EPA Administrator may also withhold, condition, or restrict sewage treatment works grants if a state does not have an approved SIP in effect. A preliminary draft policy was developed in December 1978. State and local officials are currently reviewing the draft policy.

V. CONTROL OF STATIONARY SOURCES

NEW SOURCE PERFORMANCE STANDARDS

The Clean Air Act requires the Administrator to establish national standards of performance for new sources in source categories that may cause or contribute "significantly to air pollution which may reasonably be anticipated to endanger public health or welfare." The 1977 Amendments reinforce the Act by requiring the Administrator to publish a list of categories of major sources for which standards have not been established, determine priorities, and promulgate standards of performance for these source categories by August 1982. Additional provisions of the 1977 Amendments require establishing revised emission limits and percentage reductions in emissions from fossil-fuel-fired stationary sources. Another feature of the 1977 Amendments is the review and, if necessary, the revision of standards every four years.

During 1978, EPA promulgated standards for three source categories (kraft pulp mills, lime plants, and grain elevators) and proposed nine revisions and amendments to existing standards. Guidelines were developed for two pollutants (sulfuric acid mist from sulfuric acid plants and reduced sulfur compounds from kraft pulp mills) under Section 111(d) of the Act. Standards development work begun prior to 1978 continued on 12 source categories and on six projects that had been temporarily suspended. In addition, the Agency initiated a comprehensive source category survey (the first step in the standard-setting process) for 22 source categories.

The following sections summarize major activities in developing new source performance standards during calendar year 1978.

1. Fossil-Fuel-Fired Electric Utility Steam Generating Units --The major regulatory action taken under Section 111 during 1978 was the development and proposal of a revised standard of performance to limit the sulfur dioxide, nitrogen oxides, and particulate emissions from new

fossil-fuel-fired electric utility steam generating units. In 1976, these units contributed 27 percent of the particulate matter, 65 percent of the sulfur dioxide, and 29 percent of the nitrogen oxide emissions in the nation's air. Approximately 300 new fossil-fuel-fired power plant boilers will begin operation within the next 10 years. Coal consumption is expected to increase from some 650 million tons in 1975 to between 1,400-1,800 million tons in 1990. Under the current (1978) performance standards for power plants, national sulfur dioxide emissions are projected to increase approximately 16 percent between 1975 and 1990.

Consistent with the 1977 Amendments, the revision of the regulation proposed in 1978 includes both an emission limitation and a percentage reduction, and thereby seeks to both minimize sulfur dioxide emissions and maximize the use of locally available coals. These changes would require scrubbers on virtually all new utility steam generators constructed after 1978. The principal issue associated with the proposal is whether electric utility steam generating units that fire low-sulfur-content coal should be required to achieve the same percentage reduction in potential sulfur dioxide emissions as those that burn higher-sulfur-content coal. Each alternative has significant environmental, energy, and economic implications. In the proposal, the Administrator did not indicate which of the alternatives should be adopted in the final standard. Although the full or uniform control alternative was proposed, other alternatives were also described to solicit public comments. The level of control will be determined after analyses are completed and public comments evaluated.

2. Fossil-Fuel-Fired Industrial Steam Generators -- A second major program initiated in 1978 was the development of standards for fossil-fuel-fired industrial steam generators. Under this program, EPA is gathering and studying the information needed for establishing standards for particulate, sulfur dioxide, and oxides of nitrogen emissions. Eight technologies for reducing boiler emissions are being investigated: oil cleaning and existing clean oil, coal cleaning and existing clean coal, synthetic fuels, fluidized bed combustion, particulate control, flue gas desulfurization, nitrogen oxide combustion modifications, and nitrogen oxide fuel gas treatment. The studies include characterization of the emissions, emission reduction methods, potential control costs, energy and environmental considerations, and emission test data.

3. Synthetic Organic Chemical Manufacturing Industry -- A third major project is the synthetic organic chemical manufacturing industry (SOCMI) source category. The SOCMI program, which was initiated in 1976, is designed to gather the technical and cost data base for the control of air pollution from the manufacture of organic chemicals. The principal regulations EPA anticipates from this program are new source performance standards for total volatile organic compound (VOC) emissions. This program will also provide control technique guidelines for use by states in developing SIP regulations for VOC. It will also provide a basis for national emission standards both for hazardous air pollutants from benzene and for other specific volatile organic chemical emissions that may be designated hazardous.

The SOCMI program is complex because the industry is large and complex. Organic chemicals are manufactured in an industrial chain that begins with about ten feedstock materials produced principally in petroleum refineries. These feedstocks then proceed through one or more processing tiers that result in thousands of final products. In general, each tier contains more chemicals than the preceding tier, the plants manufacturing the products are smaller than the plants supplying the feedstocks, and the volatilities of the product are lower than the volatilities of the feedstocks.

The SOCMI program focuses on the 350 to 400 plants in the basic and intermediate organic chemical manufacturing industry. For the purpose of developing standards, the industry has been divided into four categories: (1) emissions from storage tanks and transportation vessels, (2) fugitive leaks and spills of VOC, (3) losses of VOC from liquid and solid wastes, and (4) emissions from process vents.

During 1978, data gathering activities for categories (1) and (2) neared completion and the Agency began to draft control technique documents and documents to support standards of performance. Data gathering and analysis for category (3) emissions continued during 1978, as did assessment of emissions and control technology for category (4). Technical reports were begun on air oxidation and vacuum distillation.

4. Major Source Category Priority List -- More than 200 processes were studied in determining the major sources for which standards have not been established. Nearly 150 of these emerged as "major source

categories" by virtue of their potential to emit 100 tons per year or more of any one pollutant. A priority list was developed according to the 1977 Amendment criteria: (1) quantity of emissions, (2) anticipated danger to public health or welfare, and (3) the mobility and competitive nature of each source category.

An aggregated list consisting of 72 major source categories was proposed in the Federal Register on August 31, 1978.

5. Review of Existing Standards -- In 1978, EPA began reviewing ten source categories for which standards of performance have been in effect for four or more years. In this review procedure, the Agency assesses current industry statistics, process and control technology, and information on emissions, and analyzes the compliance test data obtained since adopting the current standard. The information gathered in these reviews is used to determine whether the current standards should be revised. These decisions will be published in 1979 in a series of Federal Register Notices.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

Section 112 of the Clean Air Act provides for establishing national emission standards for hazardous air pollutants. A hazardous air pollutant is one to which no ambient air quality standard applies and which the Administrator reasonably anticipates will cause or contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness. EPA's efforts to carry out the responsibilities described in Section 112 include (1) identifying and establishing priorities for potentially hazardous pollutants and their sources, (2) performing health effects and exposure risk assessments, and (3) developing standards to limit the emissions of pollutants designated as hazardous.

In 1971 EPA listed asbestos, beryllium, and mercury as hazardous pollutants and, in 1973, promulgated standards to limit emissions of these pollutants. Since then, vinyl chloride has been listed as hazardous, and standards limiting emissions from the manufacture of vinyl chloride and polyvinyl chloride have been promulgated. In 1977 benzene was added to the list of hazardous pollutants.

1. Identification of Hazardous Pollutants

Programs to identify and assess the effects of potentially hazardous pollutants continued in 1978. The Agency undertook the development of an airborne carcinogen policy to set forth planned approaches for identifying, assessing, and regulating carcinogens under the Clean Air Act. In addition, development continued on "generic" standards for hazardous organic chemicals to be made applicable, as appropriate, on an industry-wide basis.

A number of synthetic organic chemicals were studied, and health risk assessments for arsenic and coke oven emissions progressed through a review by the Science Advisory Board.

EPA initiated a health assessment pertaining to asbestiform minerals, to provide information needed to support decisions on regulating emissions from taconite mining and processing and use of crushed stone.

In the Clean Air Act Amendments of 1977 and in technical amendments to the Clean Air Act in 1978, EPA was specifically authorized to promulgate and enforce "work practice" and other non-numerical emission standards under Section 112.

2. NESHAP Development

Programs to develop standards for sources of identified hazardous pollutants continued for two categories of asbestos emission sources and ten categories of benzene emission sources. Control alternative evaluation for coke ovens and copper smelters also continued. In these programs, EPA placed major emphasis on characterization of the sources, assessment of control technology, and identification of regulatory alternatives in the standard-development process.

RESEARCH AND DEVELOPMENT OF NEW AND IMPROVED AIR POLLUTION CONTROL TECHNIQUES FOR STATIONARY SOURCES

For certain chemical processing industries, EPA undertakes source assessments (1) to evaluate the environmental impact of sources of toxic and potentially hazardous emissions from organic materials, inorganic materials, combustion and open source categories, and (2) to

determine the need for developing control technology for given types of sources. Sources under assessment include petrochemicals, nitrogen fertilizer operations, phosphate fertilizer operations, and pesticides manufacturing. In 1978, EPA completed a comprehensive assessment of emissions from the oil refining industry. Data indicate that to reduce release of volatile hydrocarbons from oil refinery operations, a maintenance program to control leaks and fugitive emissions is potentially more appropriate than applying end-of-stack controls.

Control technology for ferrous metallurgical industries is under continuing development. EPA has undertaken projects with the goal of controlling emissions from cokemaking, blast furnace tapping, and charging of basic oxygen furnaces. The Agency is trying to develop full control of emissions from the sintering of iron ore. It is also involved in an extensive effort to assess, and ultimately to bring under control, fugitive emissions from all significant sources in the production of metallurgical products. The combining of the previously separate ferrous metallurgical air and water research and development programs into a multimedia program will result in optimum control of all discharges from these industries. Program highlights for 1978 include the completion of a coke quench tower emission testing program and the completion of environmental assessment of coke by-product recovery operations.

Other representative highlights of the industrial air program in 1978 includes a completed study of alternatives for reducing SO_2 emissions from copper smelter reverberatory furnaces, the evaluation of Danish technology for control of lead emissions from secondary lead smelters, and the demonstration of carbon adsorption control of hydrocarbon emissions from the dry cleaning industry.

In 1979 and beyond, the program will focus on hydrocarbon emissions which are precursors to ozone formation, industrial particulate emissions, and the emissions of hazardous metals and compounds. The assessment and control of fugitive emissions is receiving special emphasis.

During fiscal 1978, EPA has made significant progress in developing and demonstrating improved methods to control the emissions of sulfur oxides, nitrogen oxides, and particulates. The major thrust of the

program has been and will continue to be to expand the use of our nation's most abundant energy resource--coal--in an environmentally acceptable manner. To accomplish this goal, the program has focused upon the direct combustion of coal to produce power and the production of synthetic fuels from coal.

In 1978, several significant advances in control technology progressed from the conceptual stage to the prototype and/or demonstration stage, including the use of adipic acid modified limestone wet scrubbing at 10 megawatt (electric) scale. Preliminary cost estimates indicate that, for a constant level of sulfur dioxide removal, the capital and operating costs of the adipic acid modified limestone flue gas desulfurization process can be as much as 10 percent lower than conventional processes. This technological development will provide a significant improvement in wet FGD performance and is particularly beneficial for facilities firing higher sulfur coals.

The control of particulate matter emissions from the combustion of coal has been accelerated. Efforts to demonstrate more cost-effective processes have been successful. A modification to electrostatic precipitators which was developed by EPA promises to significantly reduce the capital cost of particulate control for low sulfur-high resistivity coals.

Progress in the control of nitrogen oxides (NO_x) from direct coal combustion and from combustion of coal-derived synthetic fuels has been significant. EPA is initiating the demonstrations of low NO_x burners on coal-fired industrial and utility boilers. This technology is expected to reduce nitrogen oxide emissions to less than one half of the levels required under the current NSPS. The demonstration programs initiated in 1978 will be completed in 1982.

Taken in combination, these advances will allow the expanded use of coal in combustion processes and minimize its associated environmental impact.

While the Department of Energy (DOE) has the lead responsibility to develop advanced coal combustion processes and synthetic fuel from coal processes, EPA has an active program to assess the potential environmental impact of these technologies. EPA's Energy Program has been assigned the lead responsibility for assessing the environmental impact of the DOE-Georgetown University demonstration of industrial scale atmospheric fluid bed combustion. During an extended combustion test, EPA determined emission rates of sulfur dioxide, nitrogen oxides, particulate matter and organic compounds. Currently, EPA is actively pursuing the chemical and biological assays of samples obtained from synthetic fuels processes and direct combustion processes. These assays can be used to evaluate the samples for potential carcinogenicity. The environmental assessment activity will be continued during FY79 and beyond.

Another technological advancement is the development of dry scrubbing systems for combined particulate matter and sulfur dioxide control. Activity in the dry SO_2 control field is being stimulated by several factors. First, dry control systems are less complex than wet technology. These simplified designs offer the prospect of greater reliability at substantially lower costs than their wet counterparts. Second, dry systems use less water than wet scrubbers, which is an important consideration in the Western part of the United States. Third, the amount of energy required to operate dry systems is less than that required for wet systems. Finally, the resulting waste product is more easily disposed of than wet sludge.

This technology has been demonstrated at a number of pilot scale plants of less than 10 MW (electrical) capacity. Presently 3 full scale facilities are under construction (550, 455, and 450 MW electrical capacity) and 6 additional facilities (750, 750, 400, 400, 260, and 60 MW electrical capacity) are out for bid. The three facilities under construction are scheduled to initiate operation in the 1980-1982 time period and are designed to achieve 85, 70, and 50 percent sulfur dioxide removal efficiency. It should be noted that the 50 percent sulfur dioxide control is based on the level necessary to comply with an applicable State Implementation Plan requirement and not on the technology.

VI. CONTROL OF MOBILE SOURCE EMISSIONS

INTRODUCTION

Title II of the Clean Air Act, as amended in 1977, sets forth an extensive control program for mobile sources, including automobiles, trucks, motorcycles, and aircraft. The 1977 Amendments, while extending the requirement of a 90 percent reduction in carbon monoxide (CO), hydrocarbons (HC), and oxides of nitrogen (NO_x), also strengthened the control of mobile sources in several other areas. Specific mandates of the Act now include:

- a 90 percent reduction in HC and CO for 1983 model year heavy-duty vehicles and a 75 percent reduction in NO_x for 1985;
- measurement of evaporative emissions of heavy-duty vehicles and a study of alternate evaporative control techniques;
- establishment of inspection and maintenance (I/M) programs for in-use vehicles in many parts of the country by the early 1980's;
- particulate emission standards for certain classes of vehicles beginning with model year 1981;
- attainment of emission standards by all vehicles regardless of altitude by model year 1984;
- assurance by manufacturers that a vehicle emits no hazardous pollutants (whether specifically regulated or not) before a certificate of conformity is issued.

STANDARD SETTING

During 1978, the applicable standards for automotive emissions were 1.5 g/mile HC, 15.0 g/mile CO, and 2.0 g/mile NO_x. In addition to upholding these standards, EPA prepared to assure compliance with statutorily-mandated standard reductions which come into effect

beginning with model year 1980. By 1981, these standards will have been reduced to .41 g/mile HC, 3.4 g/mile CO, and 1.0 g/mile NO_x. (Table VI-1 summarizes the changes in standards for light-duty vehicles.)

Rulemaking activities in 1978 consisted largely of the preparation of proposed regulations whose aim is to implement or support the 1977 Clean Air Act Amendments. The final promulgation of these implementing regulations is a long-term project whose completion is not expected before 1981. (In a few cases, this will go beyond 1981.)

Existing light-duty vehicle standards are being strengthened by a series of rulemakings extending regulatory controls to previously uncovered areas. Activities for 1978 included work in the area of high-altitude vehicles, whose emissions characteristics are different from vehicles at lower levels. Both a rulemaking stipulating interim high-altitude standards and one requiring manufacturers to provide altitude adjustment instructions are being developed, with an aim of promulgation in 1979. EPA also did preparatory work on a regulation governing particulate emissions of light-duty diesel engine powered vehicles. A regulation whose goal is to limit tampering with vehicle emission control system parameters was issued in 1978. Other matters which received the Agency's attention were (1) a rule requiring manufacturers to perform research on low NO_x-emitting vehicles, (2) a rule identifying one or more short emissions tests correlating with the elaborate Federal Test Procedure (FTP), and (3) a protocol for testing fuel economy retrofit devices. EPA anticipates either preliminary or final action for most of these light-duty regulations during 1979.

EPA complemented these activities with a vastly intensified effort in the area of heavy-duty vehicle standards. The reason for this new emphasis is that existing heavy-duty standards are inadequate to protect air quality, while current testing procedures fail to represent in-use emissions. Over the course of the next several years EPA will promulgate new standards for heavy-duty gaseous, evaporative, and particulate emissions. Efforts to date in this area have focused primarily on technical and procedural problems associated with heavy-duty testing and on the determination of appropriate baselines for calculating emissions reductions. Once these issues are resolved, the standard-setting process will culminate for most of these regulations in 1980.

TABLE VI-1. FEDERAL EXHAUST EMISSIONS STANDARDS (grams/mile)[a]

	HC	CO	NO_x
Uncontrolled car	8.7	87.0	4.0
1968-69	5.9	50.8	NR
1970-71	3.9	33.3	NR
1972	3.0	28.0	NR
1973	3.0	28.0	3.1
1975-76[b]	1.5	15.0	3.1
1977-79[b]	1.5	15.0	2.0
1980[c]	0.41[d]	7.0	2.0
1981-82[c]	0.41	3.4[d]	1.0[f]
1983[c]	0.41	3.4	0.4e,g

NR = No requirement

[a] As measured by the Federal constant-volume sampling, cold- and hot-start test.

[b] Interim standards established in 1973 and subsequent years.

[c] Levels established by 1977 Amendments to the Clear Air Act.

[d] Original 1975 requirements of the 1970 Amendments to the Clear Air Act.

[e] Original 1976 requirements of the 1970 Amendments to the Clear Air Act.

[f] Subject to waiver for diesels and small manufacturers.

[g] To be established only if public health requires it; otherwise, standard is 1.0.

In another area, during 1978 EPA officially proposed a rulemaking and held a public hearing on turbine aircraft gaseous emissions retrofit and modification of the 1973 aircraft standards.

EPA's standard-setting activities are supported by ongoing programs of technology assessment and emissions characterization. Technological innovations, such as three-way catalysts and electronic control systems, are continually monitored and evaluated by EPA, as are the special technical problems related to the control of pollutants such as particulates, evaporative emissions, and oxides of nitrogen. EPA's findings in this area are regularly reported in such publications as the annual Status of Technology Report for light-duty vehicles.

The characterization of currently unregulated pollutants is an essential measure to assure continuing protection of air quality from any health hazards related to mobile sources. This is especially significant because of the recent amendment to the Clean Air Act requiring manufacturers to demonstrate that their products do not present an unreasonable risk to the public health. Of particular concern is whether new technological developments in the automotive industry hold the potential for presenting such a risk. For example, it appears that at least some manufacturers anticipate a substantial increase in the number of diesel automobiles distributed in the United States during the next several years. Preliminary evidence suggests that an element of diesel exhaust emissions is possibly carcinogenic. Further efforts to characterize diesel emissions and assess their health effects will allow EPA to determine an appropriate regulatory response to this potential problem.

COMPLIANCE ASSURANCE

During 1978, EPA initiated a major revision of one of its traditional mechanisms of assuring compliance with promulgated standards--the preproduction certification review program. Furthermore, it undertook to implement motor vehicle inspection and maintenance programs, a strategy for bringing about compliance by in-use vehicles.

CERTIFICATION

Preproduction certification review is EPA's technique of assuring that a manufacturer's vehicle design is capable of meeting emission standards. Initiated in 1968, the program involves engineering review of engine families representing all new vehicles sold in the United States. Steps in the process include submission by manufacturers of extensive technical data about prospective vehicles, emissions testing of prototypes by manufacturers, review of engineering data and test results by EPA, and, in certain cases, confirmatory testing of prototypes at EPA's laboratory facility in Ann Arbor, Michigan.

During 1978, EPA decided to proceed with a series of major changes in the certification program. This regulatory reform is intended to allow EPA to devote its energies to those engine families with the potentially greatest air quality impact, while at the same time reducing the paperwork associated with certification both for manufacturers and for EPA. Manufacturers will be given more responsibility for carrying out a testing program for those vehicles with a less significant air quality impact, with a limited review by EPA. It is expected that this reform, once it is fully implemented, will make the certification process more efficient and less burdensome while enhancing its ability to protect air quality. The first benefits of the new procedure were felt in late 1978, when many manufacturers agreed to participate in the revised certification program for Model Year 1980 on a voluntary basis. (Earlier in the year, model year 1979 vehicles had been certified in accordance with the traditional procedures, including about 1900 confirmatory tests by EPA.)

In addition to its emissions reduction role, another benefit of certification activities is the collection and analysis of data for fuel economy purposes. The information gathered by EPA supports both the Department of Transportation's Corporate Average Fuel Economy (CAFE) standard-setting and enforcement programs and the Department of Energy's consumer information program. Annual products of this

activity include the Gas Mileage Guide and new car fuel economy labels. The calculations also support a determination of compliance with CAFE standards (which for model year 1979 light-duty vehicles is 19 MPG). Approximately 1250 tests for fuel economy purposes were carried out by EPA during 1978.

INSPECTION AND MAINTENANCE

While the certification program demonstrates manufacturers' capability of designing vehicles which can meet standards, it does not address the question of in-use vehicles. Throughout the decade, testing by EPA and others has consistently indicated that vehicles on the road fail to meet the standards they were certified to meet. This occurs for a variety of reasons: production variability, fluctuating ambient weather and traffic conditions, tampering with or neglect of a car's emission control system, or use of leaded gas in a car that required unleaded. In order to protect the nation's considerable investment in automotive pollution control equipment, it is essential to devise a strategy to improve the performance of in-use vehicles.

EPA's basic approach was mandated by the 1977 Amendments to the Clean Air Act. All major urbanized areas (greater than 200,000 population) of the country, which do not expect to attain ambient air quality standards for automotive-related pollutants by 1982, must commit to implement a mandatory motor vehicle inspection and maintenance (I/M) program by the early 1980's. This commitment must be part of each appropriate State Implementation Plan (SIP) revision submitted during 1979. It must be backed up by a demonstration of adequate legislative authority by July 1979, unless the state's legislature was not in session and had no opportunity to consider any enabling legislation.

I/M programs involve periodic emissions testing of each car in an affected locality, together with a refusal to register any vehicle that fails the test and is not subsequently repaired. It is anticipated that the adoption of I/M by the areas needing it will allow them to demonstrate attainment of air quality standards by 1987, while at the same time, avoiding the possibility of restrictions on growth for stationary sources.

EPA's I/M-related activities in 1978 focused on two areas - collection of technical information and support to states and localities. Among the technical problems associated with I/M is the identification of specific short emission tests which demonstrate acceptable correlation with the Federal Test Procedure (a prerequisite for the statutory warranty provision) and the related assurance that adequate equipment is available to perform these tests. EPA expects to have satisfactory solutions to these problems well before most localities will need to proceed with implementation. Also critical to the success of I/M is the establishment of a reliable data base for predicting air quality benefits of such programs. EPA's long-term study of an ongoing program in Portland, Oregon, which was pursued throughout 1978 with a projected culmination in 1980, is the primary source of this assessment data.

Support to states desiring information about I/M has been essential because of the general lack of expertise in this field and because of the complexity of implementation. Throughout 1978, EPA experts provided advice to legislators, administrators, and technicians who needed help with SIP preparation and the creation of adequate implementing legislation. Because of I/M's many variables (central or decentralized testing, government or contractor operation, stringent or lenient cutpoint, etc.), EPA's informational role will continue well into the implementation phase.

ASSESSMENT

One major tool for assessing the effect of EPA's mobile source air pollution control efforts is the Emission Factors Program. The goal of this program is to determine the emission performance levels of in-use vehicles at varying mileage and age intervals after these vehicles are subjected to actual owner use and maintenance. By performing tests on different types of vehicles in several cities over a number of years, EPA can draw conclusions about the success of its standard-setting efforts. The collected data are also critical to various air quality models used by Federal, state, and local agencies to predict ambient air

quality. In 1978, as in previous years, about 2000 in-use automobiles were tested in six U.S. cities. EPA also performed smaller numbers of similar tests on light-duty trucks and motorcycles.

Results of this emission factor testing have consistently indicated the failure of in-use vehicles to meet standards (although their performance was better than that of earlier uncontrolled vehicles). Between one-half and two-thirds of even relatively new in-use cars fail at least one of the emission standards. In an effort to isolate reasons for this persistent failure, EPA began a program of restorative maintenance testing, which features repeated testing of in-use vehicles at various points in a repair cycle (Table VI-2). These tests have generally confirmed the emission factor program's finding of poor performance by many in-use cars. However, the tests have also demonstrated the dramatic potential for improvement as a result of even simple maintenance on in-use vehicles (for example, correction of idle mixture and speed). This evidence bolstered EPA's 1978 rulemaking limiting automotive parameter adjustability; it is also a strong argument on behalf of I/M programs.

TABLE VI-2. IN-USE VEHICLE EMISSION PERFORMANCE

(Results of EPA Restorative Maintenance Testing of in-use Vehicles)

	Percent Passing		
	California[1]	Non-California[2]	Total
Initial Test[3]	47	42	43
Second Test	58	49	51
Third Test	72	73	73
Final Test	78	81	80

1 Testing on 100 model years 1975-6 vehicles in San Francisco in accordance with California standards.

2 Testing on 300 model years 1975-6 vehicles in Detroit, Chicago, and Washington, D.C. in accordance with Federal standards.

3 Initial test - before any maintenance.

Second test - after correction of all obvious maladjustments and disablements except idle mixture and speed.

Third test - after correction of idle mixture and speed.

Final test - after major tune-up and replacement of defective components.

VII. ENFORCEMENT

STATIONARY SOURCE ENFORCEMENT

Clean Air Act Amendments of 1977

The Clean Air Act Amendments of 1977 placed additional requirements on the states and EPA. In particular, the basic enforcement approach in dealing with violating major stationary sources (here defined as facilities individually capable of emitting more than 100 tons of a pollutant per year) has been altered. EPA and the states may no longer rely primarily on the administrative order process to establish compliance schedules, but must establish these schedules by judicial action. EPA's new authority to seek civil penalties is being used in civil actions to create a positive incentive for compliance. In addition, under Section 120, EPA or a delegated state is required to give notice of noncompliance to all major sources which are not in compliance by July 1, 1979, or 30 days after discovery of the violation, whichever is later, and to establish a penalty for continued noncompliance.

During 1978, EPA spent much time and effort to develop regulations for Section 120 noncompliance penalties. (The proposed rules for assessment and collection of penalties for noncompliance were published on March 21, 1979.) The noncompliance penalty program will be implemented in 1979.

In 1978, the Agency also devoted considerable effort to developing regulations for Section 119 primary nonferrous smelter orders. The proposed rules for primary nonferrous smelter orders were published on January 31, 1979.

State Implementation Plans (SIPs)

A major goal of the EPA Stationary Source Enforcement Program is attainment and maintenance of the national ambient air quality standards

(NAAQS). The state and EPA share responsibility for ensuring that stationary sources comply with SIP emission limitations so that target levels of air quality are met. The states have primary responsibility for achieving clean air within their jurisdiction; however, the Act requires that EPA take independent action when states fail to do so. EPA also contributes to state air enforcement efforts through grants and contractual assistance. Direct enforcement by EPA is also necessary to assist states where the state is unable or unwilling to take the appropriate action to assure compliance.

Over 200,000 stationary sources are now subject to SIP emission limitations. Approximately 24,000 of these are major sources, which collectively account for about 85 percent of all air pollution from stationary sources. Therefore, enforcement efforts have centered on bringing these polluters into compliance to achieve the greatest emission reductions possible.

The enactment of the Clean Air Act Amendments of 1977 placed new responsibilities upon EPA for accelerated enforcement against all major stationary source violators. The Amendments require that all major stationary sources in violation either be granted a delayed compliance order (DCO) or be brought into compliance by means of a civil action.

Consequently, EPA began its Major Source Enforcement Effort (MSEE) to ensure expeditious compliance of large recalcitrant sources that have not yet taken the steps necessary to satisfy the requirements of the Clean Air Act (i.e., SIP requirements, NSPS, NESHAPS) and the Clean Water Act Amendments of 1977. There are, of course, other major sources which once complied but no longer do. There are also minor sources. These and other situations will not be overlooked, but they are outside the scope of this particular top priority enforcement task.

In addition, this enforcement effort against major sources not yet in compliance with the Air and Water Acts occasions the first implementation of EPA's civil penalty policy. This policy is designed to encourage compliance and deter violations by taking away the economic benefit of delayed compliance.

During FY 1978, EPA initiated 143 major air stationary source civil actions and filed 30 civil actions. Also as part of the MSEE drive, EPA proposed 43 DCOs and promulgated 26 DCOs, while the states proposed 59 DCOs and promulgated 24 DCOs.

In the past, enforcement efforts have concentrated mainly on achieving standards for particulates and sulfur oxides. It is now apparent that considerable effort will also be needed to reduce levels of photochemical oxidants since most areas are not attaining ambient standards for this pollutant. To deal with this, EPA will increase its focus on reducing levels of hydrocarbon emissions. The Agency will vigorously enforce existing emission standards, and it will assist in developing enforceable emission limits in those nonattaining areas where regulations are lacking.

An essential part of EPA's enforcement program is to assure continued compliance by sources already meeting the SIP standards. To do this, EPA and the states must conduct a large number of surveillance investigations to monitor the compliance status of these sources. The incorporation into SIPs of expanded continuous monitoring programs will substantially aid the enforcement effort.

Significant Pollution Control Agreements

Republic Steel Consent Decree - On October 5, 1978, EPA and Republic Steel made an agreement (subject to court approval) that would modernize outdated facilities and ensure continued employment for 6,400 employees at Republic's Warren and Youngstown (Ohio) plants.

Republic will build a new electric arc shop, a new sinter plant, a new hot metal desulfurization unit, and expand the blast furnace capacity at Warren. The company will close the two existing sinter plants at Warren and will close one coke battery and three blast furnaces at Youngstown. Controls will be installed and replacements will occur, so that both plants will be in full compliance with existing air pollution control requirements by December 31, 1982.

TVA Consent Decree - On December 14, 1978, the Tennessee Valley Authority (TVA), EPA, ten citizen, health, and environmental organizations, and the states of Alabama and Kentucky made a final settlement agreement (subject to court approval) to clean up air pollution at ten of TVA's electric power plants in the Southeast.

TVA is the nation's largest electric utility, and in 1975 emitted 2.1 million tons of sulfur dioxide. This is 38 percent of all sulfur dioxide pollution from power plants in the Southeast and 16 percent of all such utility pollution in the country. Under this agreement all TVA facilities are required to meet air quality standards by the end of 1982. This would mean a reduction of more than 970,000 tons of sulfur dioxide and 85,000 tons of particulate emissions a year.

The settlement requires TVA to install scrubbers at some plants and to burn less polluting coal at other plants. The scrubber requirements will allow TVA to burn Eastern coal, which often has a higher sulfur content. Particulate (dust material) air pollution controls are also required where needed. TVA is committed to reducing its sulfur dioxide emissions to about half their present levels.

This settlement, calling for capital investments of $1.02 billion and annual operating and capital costs of $447 million (1982 dollars) is the largest ever made with a major source of air pollution.

As part of the agreement, TVA acknowledges that it has saved $260 million by not complying with air pollution regulations. Under the agreement, TVA will now spend that $260 million to make its Cumberland, Tennessee, plant even cleaner than now required. The $260 million payment relieves TVA of all claims both for state civil penalties and fines and for Federal civil penalties arising under Section 113 of the Clean Air Act.

Energy

An area of increasing focus is the relationship and balance between environmental and energy concerns. The Power Plant and Industrial Fuel Use Act of 1978 prohibits, with some exemptions, new power plants and

new major fuel-burning installations from using natural gas or petroleum as a primary energy source. Also prohibited is the construction of these new sources without the capability to use coal as an alternative fuel or a primary energy source. Exemptions will be granted by the Department of Energy (DOE) when environmental requirements could not be met if coal is burned as a primary energy source. EPA must work with DOE to ensure that these new sources are constructed in accordance with NSR, NSPS, and PSD requirements. In addition, certain existing power plants that have technical capability to use coal or another alternate fuel may be issued a prohibition order; thus, EPA will have to renegotiate compliance methods and schedules to ensure that upon conversion these sources still meet environmental standards.

Section 125 was added to the Clean Air Act by the 1977 Amendments. This provides that a major fuel burning stationary source may be prohibited from using fuels other than locally or regionally available coal if it is determined that this action is necessary to prevent or alleviate significant local or regional economic disruption or unemployment which results from that source's use of other fuels.

Proceedings were instituted in Ohio under Section 125 in response to petitions received by EPA from United Mine Workers, Ohio Mining and Reclamation Association, Governor Rhodes, and Senator Metzenbaum. On December 28, 1978, EPA announced a proposed determination under Section 125(a) that action may be necessary to prevent or minimize significant local and regional economic disruption and unemployment in Ohio if utilities proceed with their plans to comply with SO_2 emission standards by switching to out-of-state low sulfur coal.

MOBILE SOURCE ENFORCEMENT

The Mobile Source Enforcement program is directed primarily toward achieving compliance with vehicle emission standards, fuel regulations, and mobile source related aspects of State Implementation Plans promulgated by EPA under the Clean Air Act. The activities of the program include preventing the introduction into commerce of uncertified new domestic

and imported vehicles; enforcing both vehicle and engine assembly line emission test activity and the recall, warranty, and antitampering provisions of the Act; developing and enforcing Federal regulations for removing lead from gasoline; and ensuring compliance with transportation control plans, mobile source related vapor recovery regulations, and inspection and maintenance programs.

Inspection/Investigation Program

Section 206(c) of the Clean Air Act authorizes the right of entry into vehicle manufacturing facilities to determine whether manufacturers are complying with the provisions of the Act. These inspections involve the visual examination of production vehicles to determine whether the vehicles are equipped with proper emission related components. During FY 1978, 31 of these inspections were conducted.

In addition, 7 investigations of manufacturers were conducted as a result of suspected violations of the Act. Final action was also taken in a case the Agency referred to the Department of Justice for civil action. General Motors Corporation agreed to pay $170,000 as a civil penalty in settlement of an action involving the production of 1517 Chevrolet vehicles with incorrect ignition distributors and 4309 Oldsmobile vehicles with incorrect carburetors.

Imports Program

Section 203 of the Act gives EPA and the U.S. Customs Service joint responsibility for enforcing the prohibition against importing nonconforming motor vehicles. During FY 1978, EPA monitored the importation of all motor vehicles that entered the United States. Of these, over 1500 were imported under bond pending a demonstration of conformity. Administrative sanctions were imposed against 250 importers for noncompliance with the regulations and two cases were referred to the Department of Justice for civil and/or criminal action.

Recall Program

Section 207(c) of the Clean Air Act authorizes EPA to order the recall of vehicles if they do not conform to emission standards. For the period from October 1977 to September 1978, 2.8 million vehicles were

recalled either by direct order of EPA or as a result of an EPA investigation. During that same period manufacturers voluntarily recalled 1.7 million vehicles to correct emissions problems. Twenty-six vehicle classes are presently under investigation.

In February 1978, Administrative Law Judge Edward B. Finch issued a decision favorable to EPA after presiding over a formal adjudicatory hearing that had been requested by Chrysler Corporation. Chrysler was contesting the Administrator's December 8, 1976 order which involved approximately 208,000 1975 Chrysler vehicles. The major issues in the litigation include the Agency's interpretation of the terms "properly maintained and used" and "substantial number" as they are used in the Act, the type of data which EPA may rely on to support a recall order, and general manufacturer liability under the Act for foreseeable in-use conditions.

The decision, which was subsequently upheld in an appeal to the Administrator, will aid in establishing EPA's authority to recall in-use vehicles that exceed standards because of a condition of misadjustment. Chrysler has exercised further rights of appeal and the case is now before the Federal Court of Appeals.

Emission Standards Waivers

Requests were reviewed from the State of California for waiver of Federal preemption for enforcement of state auto emission standards under Section 209 of the Clean Air Act. Public hearings were conducted and EPA decisions were issued on the waiver requests.

Preparations were made for auto manufacturers' requests for waiver of auto emission standards [carbon monoxide (CO) and oxides of nitrogen (NO_x)] under Section 202(b) of the Clean Air Act. They included issuing guidelines for application and preparing notices for public hearings. EPA began review of a NO_x waiver request submitted by American Motors Corporation for 1981-82 model year.

Selective Enforcement Auditing

Thirty-five Selective Enforcement Audits of light-duty vehicle manufacturers were conducted in FY 1978. One manufacturer, Chrysler Corporation, failed an audit in April 1978. As a result of the failure, Chrysler was ordered to recall and bring into compliance all of the cars of the audited configuration built since the beginning of the model year. Manufacturers tested about 20,000 production cars as part of their own qyality control emission testing programs. Based on this testing conducted by manufacturers, no more than 14 percent of the vehicles were exceeding the emission requirement for any one pollutant. Among the domestic manufacturers, approximately 390 engineering changes to production vehicles were made during the model year to improve emission performance. Most of these changes were made as a result of emission problems identified by manufacturers in their own assembly line emission testing programs.

State and Local Control Program

EPA, the Commonwealth of Pennsylvania, and a coalition of citizen and environmental groups signed a consent decree on August 29, 1978, in which the Commonwealth agreed to establish an auto emissions inspection/maintenance (I/M) program for the Philadelphia and Pittsburgh areas. The consent decree was the result of actions brought by EPA and the coalition to enforce the I/M regulation promulgated by the Agency in 1973 as part of transportation control plans for the two areas. The program will be run either by a single contractor or by a number of private garages. Mandatory inspections will begin in 1980 or 1981, depending on the program type, with required repair of heavily-polluting vehicles starting in the second program cycle. Approximately three million vehicles are covered.

The Agency has appealed the decision in another I/M enforcement action. This suit sought to require the State of Ohio to deny registration to vehicles which fail Cincinnati's I/M testing program. This case is presently awaiting oral argument before the 6th Circuit Court.

Fuel Switching/Gasoline Decontrol

As a result of numerous inquiries from the public and industry, EPA conducted intensive observations of automobile refuelings around the country to investigate the extent of fuel switching. Fuel switching is the use of leaded gasoline in vehicles that require unleaded. In addition, a contracted study investigated fuel switching sensitivity to the retail price differential between unleaded and leaded gasoline. Fuel switching was observed in about 10 percent of the refuelings of unleaded vehicles.

EPA also reviewed the DOE environmental impact statement on gasoline price decontrol and the gasoline tilt regulations and submitted comments pointing out the potential detrimental environmental effects of not controlling the retail price differential between unleaded and leaded gasoline. DOE has subsequently proposed a rule to set a maximum differential between leaded and unleaded gasoline.

Unleaded Enforcement Program

EPA has responsibility for enforcing Section 211 of the Clean Air Act, relating to the regulation of fuels and fuel additives. On January 10, 1974, EPA promulgated regulations requiring the general availability of unleaded gasoline by July 1, 1974, for use in 1975 and later model cars equipped with catalytic emission control systems.

EPA has established a nationwide fuels enforcement program to ensure that affected retail outlets comply with these regulations. This program includes sampling of the fuel at retail outlets by Regional EPA field inspectors and private and state inspectors under EPA contract, and the analysis of the samples for lead content.

In FY 1978, EPA conducted approximately 21,000 inspections of service stations to ensure compliance with the unleaded fuel regulations. This included 12,600 inspections through contracts and agreement with 18 state, county and local government agencies. EPA has issued approximately 560 complaints and has collected $250,000 in penalties during this period.

Lead Phase-down Program

On December 6, 1973, the EPA issued regulations under Section 211 of the Clean Air Act to control the amount of lead additives used in gasoline. The original lead reduction schedule limited the average amount of lead in gasoline to a maximum of 1.4 grams per gallon (gpg) in 1976, 1.0 in 1977, 0.8 in 1978, and finally to 0.5 by January 1, 1979. These regulations were upheld by the Court of Appeals for the District of Columbia Circuit in March 1976.

Because of studies indicating that a danger of a gasoline shortage might result if the original schedule was enforced, EPA amended the regulations in September 1976. The amended regulations retain the 0.5 grams per gallon standard, but extend the period for compliance with that standard from January 1 to October 1, 1978, in order to permit sufficient time for refiners to install the equipment necessary to meet the reduced lead level without causing a gasoline shortage. The January 1, 1978 standard of 0.8 grams per gallon was suspended if a refiner could show that he was taking actions to procure and install equipment sufficient to ensure that he would meet the 0.5 grams per gallon standard by October 1979 or before. In 1978, after EPA review and approval, approximately 78 percent of national refining capacity (19 refineries) was permitted to operate under suspension of the 0.8 gpg lead standard.

Tampering

A total of forty-four tampering litigation reports were referred to the Department of Justice on FY 1978. Civil penalties totalling $44,100 were collected under tampering case settlements and judgments in FY 1978. A new mobile source enforcement initiative will focus a nationally coordinated enforcement effort by conducting tampering and fuel switching inspections of the major chains of automobile repair facilities, fleet operators, new car dealerships, and gasoline retailers located in potential inspection/maintenance areas. The inspections will also be used to support the President's Denver Air Initiative.

COMPLIANCE BY FEDERAL FACILITIES

On October 13, 1978, the President issued Executive Order 12088, "Federal Compliance with Pollution Control Standards," directing the heads of Federal Agencies to bring their facilities into compliance with the environmental laws as expeditiously as possible. The President, in issuing the order, reiterated his commitment to the goals of achieving and maintaining a clean environment. The Executive Branch is to provide leadership in that effort.

To ensure that the Presidential mandate is carried out, the new order directs EPA to monitor the Federal facilities' compliance and includes a procedure for EPA, the Office of Management and Budget, and the Federal Agencies to use for resolving any disputes about non-compliance. Requests for exemptions from compliance, as authorized by the Clean Air Act, will be reviewed by the President and will be granted only in cases where he finds that national security or the paramount interest of the nation is at stake.

There are 294 Federal facilities presently classified as major sources of air pollutants. As of March 31, 1979, 60 (20 percent) of those facilities were not meeting applicable air quality standards and emission limitations. Of the 60 non-complying facilities, 12 have installed the necessary air pollution control equipment and are testing its operation for compliance, 21 are in the process of installing control equipment, and 23 have plans to correct their pollution problems. No additional equipment will be required to assure compliance at the remaining four facilities.

THE LIST OF VIOLATING FACILITIES

The List of Violating Facilities, under Section 306 of the Clean Air Act, Section 508 of the Clean Water Act, and Executive Order 11738, is designed to prevent the Federal Government from subsidizing Air and Water Act violators with contract, grant, or loan monies. In 1978, in order to fully integrate the program into EPA's enforcement activities, the program was transferred to the Office of Enforcement. This was reflected in amendments to the program regulations.

While no additional Air Act violators were listed, two facilities of ITT Rayonioer, Inc. and one of the Velsicol Chemical Corp. were listed for Water Act violations. Each of these was later de-listed when they came into compliance.

VIII. LITIGATION IN 1978

DISTRICT COURT JURISDICTION

In Kennecott Copper Corporation v. Train,[1] the Ninth Circuit held that district courts do not have jurisdiction under the citizen suit provisions of the Act (Section 304) to compel the Administrator to approve a SIP revision submitted by a state. The enforceable mandatory duty, the court held, is to act on the submission one way or the other. The court also held that in evaluating the proposed SIP revision the Administrator is not bound by state determinations of feasibility.

In Environmental Defense Fund v. Costle,[2] an environmental group challenged in Federal district court EPA's decision not to make immediately effective certain portions of the PSD provisions contained in the 1977 Amendments to the act.[3] The court found that it lacked subject matter jurisdiction since the provisions in question constituted final Agency action and, therefore, were appealable only in the proper U.S. Court of Appeals, the D.C. Circuit. The Court of Appeals refused to grant a stay pending appeal and recently upheld, on substantive grounds, the action taken by the Agency.[4]

HAZARDOUS AIR POLLUTANTS

In a divided 1978 opinion, the Supreme Court decided the Adamo Wrecking Company case[5] in a manner which cast serious doubt over the validity of "work practice" standards promulgated under Sections 111 and 112 of the 1970 version of the Clean Air Act. Adamo Wrecking had been charged with a criminal violation of EPA's Section 112 demolition standards for asbestos and defended in district court on the ground that a work practice standard (as opposed to a numerical emission standard) is not an "emission standard," and therefore, was not authorized by the 1970 Act. The Court first determined that such a defense could be presented

during enforcement proceedings (rather than solely in a timely challenge to the regulations pursuant to Section 307(b)(1) of the Act) and then essentially agreed that work practice standards are not emission standards.

The 1977 Amendments to the Clean Air Act contain specific authority for the establishment of work practice standards under both Sections 111 and 112.[6] Technical amendments passed in 1978 made clear the enforceability of such standards.[7] Work practice standards promulgated prior to the passage of the 1977 Amendments are now in the process of being repromulgated by the Agency to assure their vitality.

USE OF MODELING IN THE PROMULGATION OF SIPs

As a result of the state's failure to submit a SIP for SO_2, EPA promulgated a SIP for Ohio in August 1976. In large part, the SIP was based on sophisticated air quality dispersion modeling. Because of the number of sources involved, the modeling was the most extensive used to date. Thirty-five petitions challenging the SIP were filed with the United States Court of Appeals for the Sixth Circuit.

In February and June, 1978, the Sixth Circuit upheld EPA's promulgation of the SIP[8] except for one minor issue.[9] The Court found that the Agency's use of dispersion modeling as a "general working tool" to determine the pollution restrictions necessary to attain the air quality standards was a "rational choice" well within the Agency's discretion.[10] In addition, the Court affirmed the informal rulemaking procedures followed by the Agency in promulgating the SIP.[11] The Court also dismissed the State of Ohio's request that the EPA plan be set aside because the State was in the process of developing its own SIP. The Court stressed the inordinate amount of delay that had already occurred.[12]

AMBIENT CRITERIA AND STANDARDS

In January 1978, the American Iron and Steel Institute (AISI) and 12 steel companies filed suit in Federal district court,[13] seeking the revision and reissuance of the criteria document for particulate matter on an expedited basis. AISI also sought to enjoin the enforcement, in any

manner, of the existing national ambient air quality standard for total suspended particulate (TSP) pending revision of the standards based on a revised criteria document. On August 1, 1978, the district court ruled that, pursuant to Section 307(b)(1) of the Clean Air Act, actions to compel the Administrator to revise criteria documents or national ambient standards may be brought only in the Court of Appeals for the District of Columbia Circuit, and only the question whether the Administrator has performed his duty to review ambient criteria under Section 108(c) of the Act is subject to district court jurisdiction. Resolution of that issue has been reserved pending discovery.

REFERENCES

1. 572 F.2d 1349 (9th Cir. 1978).

2. Civil Action No. 78-281, ____F. Supp. ____ (D. D.C., March 15, 1978).

3. The provision in question, Clean Air Act Section 165, lists various requirements that must be satisfied before a major source may receive a permit to locate in a clean area.

4. Citizens to Save Spencer County et al v. EPA, D.C. Cir., Nos. 78-1002 (March 27, 1979).

5. Adamo Wrecking Co. v. United States, 434 U.S. 275 (1978).

6. Sections 111(h) and 112(e) of the Clean Air Act, as amended by Sections 109(a) and 110 of the Clean Air Act Amendments of 1977.

7. Section 13. of P.L. 95-623, the "Health Services Research, Health Statistics and Health Care Technology Act of 1978," 2 U.S. Code. Cong. and Adm. News 92 stat. 3443 (1978).

8. Cleveland Electric Illuminating Co. v. EPA, 572 F.2d 1150 (C.A. 6, 1978) cert. den. 436 U.S. 911 (1979) and Cincinnati Gas & Electric Co. v. EPA, 578 F.2d 660 (C.A. 6, 1978) cert. den. ____U.S. ____(1979).

9. The Court remanded the record to EPA to reconsider the application of its rural dispersion model for predicting pollution levels during very unstable weather conditions. Cincinnati Gas & Electric Co. v. EPA, 578 F.2d 660, 662-664 (1978). The Agency published a response to the remand in the Federal Register on February 7, 1979. 44 F.R. 7798. After the Agency has considered comments, it will publish its evaluation and take appropriate action.

10. Cleveland Electric Illuminating Co. v. EPA, 572 F.2d 1150, 1164 (1978).

11. Id.

12. Id. at 1156-1156.

13. American Iron and Steel Institute, et al v. Costle, No. 78-92 (W.D. Pa.).